GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3171614   **Date:29/12/2021**
Subject Name:Computer Vision
Time:10:30 AM TO 01:00 PM   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is Computer Vision? Enlist its applications and explain any two of them.	**03**
	(b)	What is Radiometry? Explain photometric image formation in detail.	**04**
	(c)	What do you understand by geometric 2D transformation in image formation? Explain with examples.	**07**
Q.2	**(a)**	Define the terms: Image Digitization, Normalized cut and kernel.	**03**
	(b)	What is convolution? Explain the process of image convolution with example.	**04**
	(c)	Differentiate between low pass filtering and high pass filtering.	**07**

OR

	(c)	How do you perform filtering process in frequency domain? Show step by step process with clear diagram. Explain Butterworth Low Pass filter in frequency domain.	**07**
Q.3	**(a)**	Discuss active contour technique for Segmentation.	**03**
	(b)	What is descriptor? Explain SIFT descriptor in detail.	**04**
	(c)	What is histogram? Explain histogram equalization algorithm. Write Matlab code for calculation of histogram and histogram equalization.	**07**

OR

Q.3	**(a)**	What is segmentation? Explain graph based segmentation in detail.	**03**
	(b)	Explain region splitting and region merging in image segmentation.	**04**
	(c)	Explain K-means and Gaussian Mixture Model in detail.	**07**
Q.4	**(a)**	What is watershed? Explain watershed segmentation.	**03**
	(b)	Explain Pixel transform and color transform of image with an example.	**04**
	(c)	What is Edge detection? Explain canny edge detection algorithm and write a MATLAB code to implement this algorithm.	**07**

OR

Q.4	**(a)**	Explain shape context descriptors.	**03**
	(b)	Name two morphological operations and explain them with examples.	**04**

	(c)	What is corner detection? Explain Moravec corner detection algorithm and write a MATLAB code to implement this algorithm.	**07**
Q.5	**(a)**	Explain radial distortion in camera calibration.	**03**
	(b)	What is camera calibration? Explain pinhole camera models in detail.	**04**
	(c)	What is object recognition? Explain Different components of an object recognition system in detail.	**07**

OR

Q.5	**(a)**	Which approaches are for appearance based method in object recognition? Explain them in brief.	**03**
	(b)	Explain Kalman filtering in motion tracking.	**04**
	(c)	List the types of noise. Consider that image is corrupted by Gaussian noise. Suggest suitable method to minimize Gaussian noise from the image and explain that method.	**07**

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